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Chemical abundances in the globular clusters NGC6229 and NGC6779

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Abstract

© Pleiades Publishing, Ltd. 2014. Long-slit medium-resolution spectra of the Galactic globular clusters (GCs) NGC6229 and NGC6779, obtained with the CARELEC spectrograph at the 1.93-m telescope of the Haute-Provence observatory, have been used to determine the age, helium abundance (Y), and metallicity [Fe/H] as well as the first estimate of the abundances of C, N, O, Mg, Ca, Ti, and Cr for these objects. We solved this task by comparing the observed spectra and the integrated synthetic spectra, calculated with the use of the stellar atmosphere models with the parameters preset for the stars from these clusters. The model mass estimates, Teff, and log g were derived by comparing the observed “color-magnitude” diagrams and the theoretical isochrones. The summing-up of the synthetic blanketed stellar spectra was conducted according to the Chabrier mass function. To test the accuracy of the results, we estimated the chemical abundances, [Fe/H], log t, and Y for the NGC5904 and NGC6254 clusters, which, according to the literature, are considered to be the closest analogues of the two GCs of our study. Using the medium-resolution spectra from the library of Schiavon et al., we obtained for these two clusters a satisfactory agreement with the reported estimates for all the parameters within the errors. We derived the following cluster parameters. NGC6229: [Fe/H] = −1.65 dex, t = 12.6 Gyr, Y = 0.26, [α/Fe] = 0.28 dex; NGC6779: [Fe/H] = −1.9 dex, t = 12.6 Gyr, Y = 0.23, [α/Fe] = 0.08 dex; NGC5904: [Fe/H] = −1.6 dex, t = 12.6 Gyr, Y = 0.30, [α/Fe] = 0.35 dex; NGC6254: [Fe/H] = −1.52 dex, t = 11.2 Gyr, Y = 0.30, [α/Fe] = 0.025 dex. The value [α/Fe] denotes the average of the Ca and Mg abundances.

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Keywords

Abundances—globular clusters, Galaxy, Individual, NGC6229, NGC677